How should electronically tagged patients be handled particularly regarding diathermy?

This question was asked via AfPP's Professional Advisory Service, particularly in relation to electrosurgery, and following investigation and support from the member who made the initial enquiry, the advice AfPP would recommend is that you contact the electrosurgical equipment manufacturer and ascertain their advice. At the same time contact the prison or offenders institution to find out the name of the electronic tag supplier so that if necessary both groups can have a dialogue and provide you with some advice.

We do have responses from two manufacturers which are shown below.

Our thanks to the member for their support and this information will now be included within the forthcoming 3rd edition of *Standards and Recommendations for Safe Perioperative Practice* which will be published in January 2011.

October 2010

1 Prime Parkway
Derby
DE1 3QB

ELECTRONIC MONITORING EQUIPMENT – 'TAGGING'

TO WHOM IT MAY CONCERN

I have been asked to comment on the possibility of electronic monitoring equipment or 'tags' affecting communications, electronic equipment within a hospital environment, and patient-specific equipment such as pacemakers, wearable blood pressure monitoring equipment and the like.

- **The possibility of any interference is negligible and can be ignored.**
- **The tag is robust and has no moving parts.**
- **It should not be permanently affected by magnetic fields.**
- **It should not interfere with any hospital equipment.**
- **It will not interfere with patient-specific equipment, e.g. pacemakers**

FURTHER INFORMATION

A tag or 'personal identification device' that is used as part of the justice service system consists of a small transmitter that is worn round an ankle, or occasionally round a wrist. The tag communicates with a monitoring unit that is placed at the curfew premises.

Tags have a very limited range, and send out extremely weak signals, because the system is designed to confine the tag within the home and not over long distances. This limits the possibility of any interference with other electrical equipment.

The tag and monitoring unit communicate with each other several times a minute using an encrypted beacon signal that changes each time the signal is sent. There are at least ten million million combinations of that signal so it is extremely unlikely that any instrument or system in a hospital can be affected by transmissions from the tag within that instrument's lifetime.

The signal is digital, and the periodic transmission is of a very short duration, typically 12-20 milliseconds. The operating frequency of transmission is in a public band that is common to many other devices such as automatic door openers and the like, many of which may already be operating within a hospital environment. The possibility of two devices transmitting together and disrupting their signals is extremely remote and can effectively be ignored.

Hospital health monitoring equipment and patient-specific items like pacemakers are usually hard-wired and cannot be interfered with by tagging equipment. Even equipment operating

1 Prime Parkway
Derby
DE1 3QB

with radio signalling is encoded and will not accept or act upon transmissions from a tagging device.

Tagging equipment meets current requirements for electronic equipment and is licence free. It has to meet the following standards and codes of practice, in common with all other similar equipment that may be used in a hospital setting.

a) OFCOM regulations as they are developed and updated from time to time;

b) European directives on magnetic compatibility;

c) Waste Electrical and Electronic Equipment Directive (WEEE 2002/96/EC);

d) Restriction of Hazardous Substances in electronic and electrical equipment Directive (RoHS 2002/95/EC);

e) Radio and Telecommunications Terminal Equipment Directive (R&TTE 1999/5/EC);

f) Standards provided by the National Radiological Protection Board from time to time;

g) BS EN 60950-1:2002 Information Technology Equipment – Safety – Part 1: General Requirements.

J CAMPBELL BSc CEng
Forensic Scientist
Author of the Home Office Monitoring System specification.

Dated: 12.6.08. Reviewed 10.9.09

October 25, 2010

Dear Valued Customer,

Thank you for contacting the Covidien Energy-based Devices (EbD) Clinical Hotline for Valleylab™ products with your question about detention bracelets, monitoring tags or other electronic monitoring devices and the use of electrosurgery. Metal objects such as jewelry, shackles, detention bracelets or tags with any metal parts, snaps, clamps or pins could have the potential to conduct electrosurgical current when metal items are within the current pathway.

If the facility is standardized on Valleylab™ isolated electrosurgical generators, rest assured this technology significantly decreases the dangers of the electrosurgical current seeking an alternate pathway to ground since the current will only travel from the surgical site to the PRE. The same would be true for other manufacturers of isolated generator technology but the purpose of this letter will only be addressing Valleylab™ products.

Detention bracelets or electronic detention monitoring devices function in much the same way but most likely will have physical design differences. Depending on the manufacturer of the device it may or may not be easily removable. If the monitoring device is located within the electrosurgical (ES) circuit it must be removed. Removing such a device could require special tools and the presence of a law enforcement officer to carry out the removal procedure. Knowing in advance that a surgical patient has such a device could prevent delays on the day of surgery. Following the surgical procedure the monitoring device can be reapplied and possibly reprogrammed.

If the monitoring device or bracelet **cannot** be removed, Covidien EbD recommends applying Webril™, Kerlix™ or some other non-conductive padding around the ankle area or at the location of the monitoring device to isolate it from the patient's skin. This intervention will serve to insulate the patient from any rivets or other metal components that may be on the underside of the bracelet or monitoring device and can also protect the patient from potential positioning concerns.

The electrosurgical unit (ESU) or generator operates at frequencies in the 200kHz to 3.3 MHz range to avoid muscle and nerve stimulation which cease above 100 kHz. In addition to the high frequency the ESU requires to operate, high voltages are required to push the electrical current through the patient's tissue. The effect of these high voltages can be seen when sparking to tissue using either the fulgurate or spray coagulation modes found on most ESUs. By their nature of operation, ESUs have a high potential for interfering with other electronic devices found in the operating room environment or introduced to the operating room environment either in or on the surgical patient.

The electromagnetic energy emanating from the ESU can result in electromagnetic interference which is defined as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of

electronics/electrical and battery-operated devices. For this reason it is recommended the detention bracelet, monitoring tag, or other electronic monitoring device be checked post-operatively for proper function before patient discharge. Always consult with the electronic device manufacturer for their recommendations regarding their technology and the use of electrosurgery.

Please contact the Covidien EbD Clinical Hotline for Valleylab™ products if you have other electrosurgical safety questions or concerns.

Sincerely,
Cherie Loeffler, RN, BSN, CNOR
Senior Clinical Specialist
800.255.8522 Ext. 6221
800.255.8522 Ext. 2005 (24-7 Hotline)
Valleylab.clinicalhotline@covidien.com